

What is claimed is:

- 1 1. A method of providing weighted grammars for speech recognition in a
2 vehicle navigation system, the method comprising:
3 receiving grammar for speech recognition, the grammar including a
4 plurality of tokens;
5 receiving geographical information corresponding to the tokens; and
6 calculating weights corresponding to the tokens based upon the
7 geographical information.
- 1 2. The method of claim 1, wherein the geographical information includes
2 sizes of locations corresponding to the tokens and each of the weights associated with
3 each token is affected by the location corresponding to each token.
- 1 3. The method of claim 1, wherein the geographical information includes
2 populations of locations corresponding to the tokens and each of the weights associated
3 with each token is affected by the population of the location corresponding to each token.
- 1 4. The method of claim 1, wherein the geographical information includes
2 popularity of locations corresponding to the tokens and each of the weights associated
3 with each token is affected by the popularity of the location corresponding to each token.
- 1 5. The method of claim 1, further comprising:
2 receiving location information indicating the location of a vehicle for
3 which the vehicle navigation system is used, the weights being

4 calculated based upon the location information as well as the
5 geographical information.

1 6. The method of claim 5, wherein the geographical information includes
2 distances between the vehicle location and the locations corresponding to the tokens and
3 each of the weights associated with each token is affected by the corresponding distances.

1 7. The method of claim 5, wherein the geographical information includes
2 distances between the vehicle location and locations corresponding to the tokens and the
3 size of the locations corresponding to the tokens, and the weight (W) associated with
4 each of the tokens is calculated by:

5
$$W = SG / (Dcg + C),$$

6 where SG is the size of the location corresponding to the token, Dcg is the distance from
7 the vehicle location to the location corresponding to the token, and C is a predetermined
8 constant.

1 8. The method of claim 5, wherein the geographical information includes
2 distances between the vehicle location and locations corresponding to the tokens and the
3 population of the locations corresponding to the tokens, and the weight (W) associated
4 with each of the tokens is calculated by:

5
$$W = PG / (Dcg + C),$$

6 where PG is the population of the location corresponding to the token, Dcg is the distance
7 from the vehicle location to the location corresponding to the token, and C is a
8 predetermined constant.

1 9. The method of claim 5, wherein the geographical information includes
2 distances between the vehicle location and locations corresponding to the tokens and the
3 size and population of the locations corresponding to the tokens, and the weight (W)
4 associated with each of the tokens is calculated by:

5
$$W = (SG + PG) / (Dcg + C),$$

6 where SG is the size of the location corresponding to the token, PG is the population of
7 the location corresponding to the token, Dcg is the distance from the vehicle location to
8 the location corresponding to the token, and C is a predetermined constant.

1 10. The method of claim 5, wherein the geographical information includes
2 distances between the vehicle location and locations corresponding to the tokens and the
3 size, population, and the popularity indices of the locations corresponding to the tokens;
4 and the weight (W) associated with each of the tokens is calculated by:

5
$$W = (SG + PG + IG) / (Dcg + C),$$

6 where SG is the size of the location corresponding to the token, PG is the population of
7 the location corresponding to the token, IG is the popularity index of the location
8 corresponding to the tokens, Dcg is the distance from the vehicle location to the location
9 corresponding to the token, and C is a predetermined constant.

1 11. The method of claim 1, further comprising:
2 comparing input speech with the tokens;
3 generating confidence scores corresponding to the tokens based upon the
4 comparison; and

5 modifying the confidence scores based upon the weights associated with
6 the tokens.

1 12. The method of claim 11, wherein modifying the confidence scores
2 comprises multiplying the confidence scores by their associated weights.

1 13. A method of speech recognition, the method comprising:
2 receiving tokens in grammar and weights associated with the tokens, the
3 weights being derived by information on a location and
4 geographical information corresponding to the tokens;
5 comparing input speech with the received tokens;
6 generating confidence scores corresponding to the tokens based upon the
7 comparison; and
8 modifying the confidence scores based upon the weights associated with
9 the tokens.

1 14. The method of claim 13, wherein modifying the confidence scores
2 comprises multiplying the confidence scores by their associated weights.

1 15. A speech recognition system for use in a vehicle navigation system, the
2 speech recognition system comprising:
3 a grammar database storing grammars including tokens corresponding to
4 parts of addresses;
5 a geographical information database storing geographical information
6 corresponding to the tokens; and

7 a grammar generator selecting one or more of the tokens and assigning
8 weights to the selected tokens, the weights being determined based
9 upon the geographical information.

1 16. The speech recognition system of claim 15, wherein the geographical
2 information includes sizes of locations corresponding to the tokens and each of the
3 weights associated with each token is affected by the location corresponding to each
4 token.

1 17. The speech recognition system of claim 15, wherein the geographical
2 information includes populations of locations corresponding to the tokens and each of the
3 weights associated with each token is affected by the population of the location
4 corresponding to each token.

1 18. The speech recognition system of claim 15, wherein the geographical
2 information includes popularity of locations corresponding to the tokens and each of the
3 weights associated with each token is affected by the popularity of the location
4 corresponding to each token.

1 19. The speech recognition system of claim 15, wherein the weights are
2 further determined based upon the location of a vehicle for which the vehicle navigation
3 system is used.

1 20. The speech recognition system of claim 19, wherein the geographical
2 information includes distances between the vehicle location and the locations

3 corresponding to the tokens and each of the weights associated with each token is
4 affected by the corresponding distances.

1 21. The speech recognition system of claim 19, wherein the geographical
2 information includes distances between the vehicle location and locations corresponding
3 to the tokens and the size of the locations corresponding to the tokens, and the weight
4 (W) assigned to each of the token is calculated by:

5
$$W = SG / (Dcg + C),$$

6 where SG is the size of the location corresponding to the token, Dcg is the distance from
7 the vehicle location to the location corresponding to the token, and C is a predetermined
8 constant larger than zero.

1 22. The speech recognition system of claim 19, wherein the geographical
2 information includes distances between the vehicle location and locations corresponding
3 to the tokens and the population of the locations corresponding to the tokens, and the
4 weight (W) assigned to each of the tokens is calculated by:

5
$$W = PG / (Dcg + C),$$

6 where PG is the population of the location corresponding to the token, Dcg is the distance
7 from the vehicle location to the location corresponding to the token, and C is a
8 predetermined constant larger than zero.

1 23. The speech recognition system of claim 19, wherein the geographical
2 information includes distances between the vehicle location and locations corresponding
3 to the tokens and the size and population of the locations corresponding to the tokens, and
4 the weight (W) assigned to each of the tokens is calculated by:

5 $W = (SG + PG) / (Dcg + C),$

6 where SG is the size of the location corresponding to the token, PG is the population of
7 the location corresponding to the token, Dcg is the distance from the vehicle location to
8 the location corresponding to the token, and C is a predetermined constant larger than
9 zero.

1 24. The speech recognition system of claim 19, wherein the geographical
2 information includes distances between the vehicle location and locations corresponding
3 to the tokens and the size, population, and the popularity indices of the locations
4 corresponding to the tokens, and the weight (W) assigned to each of the tokens is
5 calculated by:

6 $W = (SG + PG + IG) / (Dcg + C),$

7 where SG is the size of the location corresponding to the token, PG is the population of
8 the location corresponding to the token, IG is the popularity index of the location
9 corresponding to the token, Dcg is the distance from the vehicle location to the location
10 corresponding to the token, and C is a predetermined constant larger than zero.

1 25. The speech recognition system of claim 15, further comprising:
2 a speech recognition engine comparing input speech with the tokens and
3 generating confidence scores corresponding to the tokens based
4 upon comparison, the speech recognition engine modifying the
5 confidence scores based upon the assigned weights.

1 26. The speech recognition system of claim 25, wherein the speech
2 recognition engine modifies the confidence scores by multiplying the confidence scores
3 with the assigned weights.

1 27. A computer program product stored on a computer readable medium and
2 adapted to perform a method of providing weighted grammar for speech recognition in a
3 vehicle navigation system, the method comprising:

4 receiving tokens in grammar for speech recognition;
5 receiving geographical information corresponding to the tokens; and
6 calculating weights corresponding the tokens based upon the geographical
7 information.

1 28. The computer program product of claim 27, the method further
2 comprising:

3 receiving location information indicating the location of a vehicle for
4 which the vehicle navigation system is used, the weights being
5 calculated based upon the location information as well as the
6 geographical information.

1 29. A computer program product stored on a computer readable medium and
2 adapted to perform a method of speech recognition in a vehicle navigation system, the
3 method comprising:

4 receiving tokens in grammar and weights associated with the tokens, the
5 weights being derived based upon geographical information
6 corresponding to the tokens;
7 comparing input speech with the tokens;
8 generating confidence scores corresponding to the tokens based upon the
9 comparison; and
10 modifying the confidence scores based upon the received weights.

1 30. The computer program product of claim 29, wherein the weights are
2 derived based upon the location of a vehicle for which the vehicle navigation system is
3 used as well as the geographical information.

1 31. A speech recognition system for use in a vehicle navigation system, the
2 speech recognition system comprising:
3 a geographical information database storing geographical information;
4 a grammar generator assigning weights to tokens in a grammar, the tokens
5 corresponding to a part of an address and the weights being
6 determined based upon the geographical information
7 corresponding to the tokens; and
8 a grammar database storing the grammar including the tokens and the
9 assigned weights.

1 32. The speech recognition system of claim 31, further comprising:

2 a grammar selector for selecting part of the tokens and the associated
3 weights stored in the grammar database, based upon a location of a
4 vehicle.